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NUREG/CR-4664

Closeout of IE Bulletin 83-04: Failure of the Undervoltage Trip Function of Reactor Trip Breakers

ORIGINAL

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PARAMETER, Inc.

Prepared for
U.S. Nuclear Regulatory
Commission

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NUREG/CR-4664
PARAMETER IE-161

Closeout of IE Bulletin 83-04: Failure of the Undervoltage Trip Function of Reactor Trip Breakers

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Washington, DC 20555
NRC FIN B8729

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ABSTRACT

During shutdown of San Onofre units 2 and 3 on March 3 and 8, 1983, four General Electric (GE) Type AK-2 circuit breakers in the reactor protection systems (RPSs) failed to open on activation of the undervoltage trip coil during testing. Since issuance of IE Bulletin 79-09 April 17, 1979 on failures of GE Type AK-2 breakers, additional failures had been reported before the tests at San Onofre. Because of concern about continued failures of the subject breakers in RPSs, the NRC/IE issued IE Bulletin 83-04 on March 11, 1983. All licensees of operating pressurized water power reactors, except those with Westinghouse Type DB breakers, were required to take five specific actions. The bulletin was issued for information to all other nuclear power facilities. Evaluation of utility responses and NRC/IE inspection reports indicates that the bulletin can be closed out for all of the 50 facilities to which it was issued for action. Six plants had breakers which failed to operate satisfactorily during tests for bulletin requirements. There are no remaining areas of concern for this bulletin.

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CLOSEOUT OF IE BULLETIN 83-04: FAILURE OF THE UNDERVOLTAGE TRIP FUNCTION OF REACTOR TRIP BREAKERS

INTRODUCTION

In accordance with the Statement of Work in Task Order 015 under NRC Contract 05-85-157-02, this report provides documentation for the closeout status of IE Bulletin 83-04. Documentation is based on the records obtained from the NRC Document Control System, the IE File and the files of the technical contacts initially assigned to the bulletin.

IE Bulletin 83-04 was issued to licensees of operating PWRs (except those with Westinghouse Type DB breakers) for action March 11, 1983. It was issued for information to all other nuclear power facilities. The NRC/IE issued the bulletin because of concern about failures of General Electric Type AK-2 circuit breakers in reactor protection systems (RPS) to trip open during testing of the undervoltage trip function. The bulletin applies to all RPS breakers other than Westinghouse Type DB, which are covered by IEB 83-01.

For background information and required actions, IE bulletins 83-04 and 83-01 are included in Appendix A. Evaluation of utility responses and NRC/IE inspection reports is documented in Appendix B as the basis for bulletin closeout, and facilities to which the bulletin was issued for information are listed. Abbreviations used in this report and associated documents are presented in Appendix C.

SUMMARY

1. The bulletin has been closed out for the following facility which has been shut down indefinitely (Criterion 1):

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2. The bulletin has been closed out for the following 27 facilities which have only Westinghouse Type DB breakers in reactor protective systems (Criterion 2):

Beaver Valley 1	North Anna 1,2	Sequoyah 1,2
Cook 1,2	Point Beach 1,2	Surry 1,2
Ginna	Prairie Island 1,2	Trojan
Haddam Neck	Robinson 2	Turkey Point 3,4
Indian Point 2,3	Salem 1,2	Zion 1,2
Kewaunee	San Onofre 1	

3. The bulletin has been closed out for the following 23 facilities for which a utility response indicates compliance with required actions and an NRC/IE inspection report indicates that required and corrective actions have been completed satisfactorily (Criterion 3):

Arkansas 1,2	Maine Yankee	San Onofre 2,3
Calvert Cliffs 1,2	McGuire 1	St. Lucie 1
Crystal River 3	Millstone 2	Summer 1
Davis-Besse 1	Oconee 1,2,3	TMI 1
Farley 1,2	Palisades	Yankee-Rowe 1
Fort Calhoun 1	Rancho Seco 1	

CONCLUSIONS

1. Six plants had breakers which failed to open or operated sluggishly upon signal to the UV device while being tested per bulletin requirements. These six were:

Arkansas 1	Maine Yankee	McGuire 1,2
Calvert Cliffs 1,2		

2. Breakers and UV attachments are maintained by following the manufacturer's recommendations with minor exceptions for type of lubricant used and frequency of maintenance.

3. About fifteen breaker malfunctions that had not been previously reported to the NRC were identified for eight plants. Approximately half of these did not affect the breaker's ability to trip, but were for such malfunctions as failure to close and failure of trip indicator lights to operate.

4. At two facilities (Crystal River 3 and Maine Yankee), the procurement of breakers and their attachments was not being treated as safety-related prior to the bulletin. These licensees have initiated appropriate actions to rectify this situation.

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REMAINING AREAS OF CONCERN

There were no remaining areas of concern identified.

There are ongoing problems with reactor trip breakers beyond the scope of this bulletin. These problems are being investigated by the NRC through later bulletins, generic letters, and information notices.

CRITERIA FOR CLOSEOUT OF BULLETIN

The bulletin is closed out for facilities to which one of the following criteria applies:

1. The facility has been shut down indefinitely.

2. A utility response for IEB 83-01 indicates that the facility has only Westinghouse Type DB reactor trip breakers with UVTAs.

3. A response for the facility indicates compliance with required actions and an NRC/IE inspection report indicates that required and corrective actions have been completed satisfactorily.

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APPENDIX A

Background Information and Required Actions

Note: For required actions, see pages A-2 and A-3.

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SSINS No.: 6820
OMB No.: 3150-00012
Expiration Date: 04/30/85
IEB 83-04

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON,. D.C. 20555

March 11, 1983

IE BULLETIN NO. 83-04: FAILURE OF THE UNDERVOLTAGE TRIP FUNCTION OF REACTOR TRIP BREAKERS

Addressees:

All pressurized water nuclear power reactor facilities holding an operating license (OL) except those with Westinghouse DB type breakers for action and to other nuclear power reactor facilities for information.

Purpose:

The purpose of this bulletin is to inform CP holders and licensees about recent failures of General Electric AK-2 type circuit breakers to trip open during testing of the undervoltage (UV) trip function and to require action of operating pressurized water reactors to assure proper operation of all reactor trip breakers in the future.

Description of Circumstances:

On March 11, 1983, Southern California Edison reported that during testing on March 3 and 8, 1983 of reactor protective system (RPS) breakers at San Onofre Nuclear Generating Station (SONGS) Units 2 and 3, three reactor trip breakers on Unit 2 and one reactor trip breaker on Unit 3 failed to open on activation of the undervoltage trip coil. Both units were shutdown at the time of the tests. The SONGS RPS systems are designed such that a reactor trip signal energizes the shunt trip coil and deenergizes the undervoltage trip coil. All tests of the reactor trip breakers using the shunt trip coil were satisfactory. A reactor scram would have occurred if an automatic or manual signal had been generated during operation from the redundant undervoltage and/or the shunt coils.

Background:

In some RPS designs, the automatic protection signals are fed only to the undervoltage (UV) trip attachment of the reactor trip breakers. Other plants may actuate both the UV device and the shunt trip coil on RPS trip.

As described above, four RPS breakers at the SONGS Units 2 and 3 failed to open during testing. Other failures involving the GE type UV trip attachment to the RPS have been reported to the NRC. These failures were due to either binding or

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out-of-adjustment within the linkage mechanism of the UV trip device installed in General Electric (GE) type AK-2 (i.e., AK2A-15, 25, 50, 75, 100) circuit breakers. Failures have occurred at ANO-1, Crystal River-3, Oconee Units 1 and 3, TMI-1, and St. Lucie. As a result of these events, the NRC issued IE Bulletin No. 79-09 dated April 17, 1979 and IE Circular 81-12 dated July 20, 1981. Subsequently, failures have been reported at ANO-1 and Rancho Seco.

Required Actions for Holders of Operating Licenses for Pressurized Water Reactors:

PWR licensees with other than W DB type breakers in Reactor Protective System applications are requested to:

1. Perform surveillance tests of undervoltage trip function independent of the shunt trip function within 5 days of receipt of this Bulletin unless equivalent testing has been performed within 10 days. Those plants currently shutdown should complete this item before resuming operation or within 10 days, whichever is sooner. Those plants for which on-line testability is not provided should complete this item at the next plant shutdown if currently operating.

2. Review the maintenance program for conformance to the latest manufacturer's recommendation, including frequency and lubrication. Verify actual implementation of the program.* If maintenance does not conform, initiate such maintenance within 5 days of receipt of this bulletin or provide an alternate maintenance program. Repeat the testing required in item 1 prior to declaring the breaker OPERABLE.

3. Notify all licensed operators of the failure-to-trip event which occurred at Salem (see IE Bulletin 83-01) and the testing failures at San Onofre Units 2 and 3 described above. Review the appropriate emergency operating procedures for the event of failure-to-trip with each operator upon his arrival on-shift.

4. Provide a written reply within 10 days of receipt of this bulletin:

   a. Identify results of testing performed in response to item 1. Plants without on-line testability should report the date and results of the most recent test.

   b. Identify conformance of the maintenance program to manufacturer's recommendation and describe results of maintenance performed directly as a result of this Bulletin in response to item 2.

*IE Bulletin 79-09, dated April 17, 1979, had as an attachment an extract of General Electric (GE) Service Advice Letter No. 175(CPDD)9.3 which is applicable to GE type AK-2 breakers.

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c. Provide a statement that provisions are in place to notify licensed operators of the Salem and San Onofre events and bring to their attention appropriate failure-to-trip emergency procedures upon their arrival on-shift.

d. Provide a description of all RPS breaker malfunctions not previously reported to the NRC.

e. Verify that procurement, testing and maintenance activities treat the RPS breaker and UV devices as safety related. Report the results of this verification to the NRC.

5. Any RPS breaker failure identified as a result of testing requested by this bulletin should be promptly reported to the NRC via the emergency notification system, regardless of the operating mode of the plant at the time of the failure.

The written report required shall be telefaxed to Richard C. DeYoung, Director, Office of Inspection and Enforcement within 10 days of receipt of this bulletin.** At the same time, the report shall be submitted to the appropriate Regional Administrator under oath or affirmation under provisions of Section 182a, Atomic Energy Act of 1954, as amended. The original copy of the cover letters and a copy of the reports shall be transmitted to the U. S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555 for reproduction and distribution.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-0C012 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, D.C. 20503.

If you have any questions regarding this matter, please contact the Regional Administrator of the NRC Regional Office or the technical contact listed below.

Original Signed by
James H. Sniezek

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: I. Villalva, IE
301-492-9635

V. Thomas, IE
301-492-4755

Attachment:
1. List of Recently Issued IE Bulletins

**Rapidfax (301) 492-8187 or (301) 492-7376
3M Remote Copies (301) 492-7285

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SSINS No.: 6820
OMB No.: 3150-00012
Expiration Date: 04/30/85
IEB 83-01

UNITED STATES
NUCLEAR REGULATORY COMMISSION
OFFICE OF INSPECTION AND ENFORCEMENT
WASHINGTON, D.C. 20555

February 25, 1983

IE BULLETIN NO. 83-01: FAILURE OF REACTOR TRIP BREAKERS (WESTINGHOUSE DB-50) TO OPEN ON AUTOMATIC TRIP SIGNAL

Addressees:

All pressurized water nuclear power reactor facilities holding an operating license (OL) for action and to other nuclear power reactor facilities for information.

Purpose:

The purpose of this bulletin is to inform CP holders and licensees about recent failures of W DB type circuit breakers to trip open on receipt of an automatic trip signal from the reactor protection system (RPS) and to require action of all operating pressurized water reactors to assure proper operation of those breakers in the future.

Description of Circumstances:

On February 25, 1983, during startup of the Salem Unit 1 plant, both DB-50 RPS breakers failed to open automatically upon receipt of a valid trip signal on low-low steam generator level.

This failure to trip has been attributed to sticking of the undervoltage trip attachment. The reactor was tripped manually from the control room about 30 seconds after the automatic trip signal was generated. The manually initiated trip was accomplished by the shunt relays installed in each DB-50 breaker.

Background:

In some reactor protection system designs, the automatic protection signals are fed only to the undervoltage (UV) trip attachment of the reactor trip breakers; the manual signals are fed both to the UV trip and to a shunt trip coil of each breaker.

In the recent past, on two separate occasions, one RPS breaker at the Salem facility failed to open automatically due to binding of the UV trip attachment. These events have been reported in LER's 82-072/03X-1 and 83-001/03L. In addition, on February 22, 1983, Salem Unit 1 tripped on low-low steam generator level; however, since the operator manually tripped the reactor at a time almost coincidental with the automatic trip signal, the actual trip mechanism (manual or automatic) cannot be ascertained.

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Similar failures involving the UV trip attachment to the RPS have been reported to the NRC. These failures only involved one of the two series breakers, therefore they did not result in a failure to automatically trip the reactor. Said failures have occurred at H. B. Robinson, Connecticut Yankee, Prairie Island and St. Lucie in addition to those at Salem. As a result of these events, the NRC issued IE Bulletin No. 71-02 and IE Circular No. 81-12, and Westinghouse issued Technical Bulletin No. NSD-78-74-1 dated January 11, 1974 and NSD Data Letter 74-2 dated February 14, 1974.

Required Actions for All Holders of Operating Licenses for Pressurized Water Reactors:

Licensees with W DB type breakers using undervoltage trip attachment in Reactor Protective System applications are requested to:

1. Perform surveillance test of undervoltage trip function independent of the shunt trip within 24 hours of receipt of this Bulletin unless equivalent testing has been performed within 5 days. Those plants for which on-line testability is not provided may complete this item before resuming operation or if currently operating, at the next plant shutdown.

2. Review the maintenance program for conformance to recommended W program (attachment) including frequency and lubricant applied to trip mechanism. Verify actual implementation of the W program. If maintenance including lubrication does not conform, initiate such maintenance within 5 days of receipt of this bulletin or provide an alternate maintenance program. Repeat the testing required in item 1 prior to declaring the breaker OPERABLE.

3. Notify all licensed operators of the failure-to-trip event which occurred at Salem. Review the approporiate emergency operating procedures for the event of failure-to-trip with each operator upon his arrival on-shift.

4. Provide written reply within 7 days of receipt of this bulletin,

   a. identifying results of testing performed in response to item 1,

   b. identifying conformance of maintenance program to W recommendation and describing results of maintenance performed directly as a result of this Bulletin in response to item 2,

   c. provide statement that provisions are in place to notify licensed operators of the Salem event and bring to their attention appropriate failure-to-trip emergency procedures upon their arrival on-shift.

   d. You are reminded of the requirements for prompt notification in accordance with 10 CFR 50.72 in the event of detecting an inoperable RPS breaker.

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PWR Licensees not using the subject undervoltage trip attachment and therefore not affected by this bulletin shall submit a negative declaration within 7 days of the receipt of this bulletin.

The written report required shall be submitted to the appropriate Regional Administrator under oath or affirmation under provisions of Section 182a, Atomic Energy Act of 1954, as amended. The original copy of the cover letters and a copy of the reports shall be transmitted to the U. S. Nuclear Regulatory Commission, Document Control Desk, Washington, D.C. 20555 for reproduction and distribution.

This request for information was approved by the Office of Management and Budget under a blanket clearance number 3150-00012 which expires April 30, 1985. Comments on burden and duplication may be directed to the Office of Management and Budget, Reports Management, Room 3208, New Executive Office Building, Washington, D.C. 20503.

If you have any questions regarding this matter, please contact the Regional Administrator of the NRC Regional Office or the technical contact listed below.

Richard C. DeYoung, Director
Office of Inspection and Enforcement

Technical Contact: T. Villa, IE
301-492-9635

V. Thomas, IE
301-492-4755

J. T. Beard, NRR
301-492-7465

Attachment:
1. Transcription of Westinghouse NSD Ltr. 74-2
2. List of Recently Issued IE Bulletins

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ATTACHMENT 1
IEB 83-01
February 25, 1983

Verbatim transcription of Westinghouse NSD letter 74-2. Original signed by W. H. Furfari and Sydney G. Caslake.

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NSD DATA LETTER 74-2

FROM : Nuclear Service Division
WIN : 236-4744
DATE : February 19, 1974
SUBJECT: Reactor Trip Breaker Maintenance

NUCLEAR ENERGY SYSTEMS

TO: Distribution

Technical Bulletin NSD-TB-74-1 (issued 1/11/74) described a reactor trip breaker malfunction which occurred at H. B. Robinson station in December of 1973, and recommended certain additional periodic maintenance measures to improve the reliability of these breakers.

The malfunction (failure to trip during a regularly scheduled periodic test) was attributed to excessive friction in the linkage of the Under-voltage Trip Attachment, which is the device that initiates the breaker drop-open action by elevating the trip bar. The problem was corrected by cleaning and lightly lubricating certain portions of the linkage.

To preclude the possibility of reoccurrence of this malfunction, Westinghouse recommends that the reactor trip breakers be given regularly scheduled periodic inspection/maintenance as described in the Instruction Manual and in line with the following guidelines.

1. Scope. These recommendations are intended to apply to Westinghouse DB-50 (or DB-25) breakers in Reactor Trip applications. Some future WNES plants will be supplied with Westinghouse Type DS (stored energy) breakers, which should be maintained in accordance with their instruction manual.

2. Related Operations. It is expected that these inspection and maintenance measures would normally be carried out in conjunction with breaker periodic operational testing or during plant shutdowns. However, these recommendations in no way are intended to supersede breaker operational testing commitments and requirements.

3. Frequency. Intervals between maintenance will be influenced by operating and atmospheric conditions, but we would recommend that initially it be performed on a semi-annual basis. The period might then be extended to 9 or 12 months if experience shows this to be sufficient.

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4. Cleaning. Clean the entire unit by blowing with dry instrument air (or a hand bellows), followed by vacuum cleaning. Particular attention should be paid to the cleanness of the undervoltage trip device, which can be inspected without component disassembly.

5. Solvents. In general, the use of a cleaning solvent is not encouraged since some can be damaging to electrical components. If there is a particularly heavy deposit of contaminants, an inert or mild solvent such as Stoddard solvent could be used if applied sparingly.

6. Lubricants. Although the Instruction Manual (page 5) cautions against any re-lubrication in the field, the manufacturers have agreed that the reliability of the breaker is improved by lightly lubricating the linkage of the undervoltage device occasionally. However, the lubricant should be applied only sparingly to the front and back faces of the vertical-traveling latch (interfacing with the flat copper-alloy spring).

   A dry or near-dry molybdenum disulfide lubricant should be used. Technical Bulletin NSD-TB-74-1 indicated Molykote G as a possible choice. That information is incorrect and is hereby rescinded Molykote G uses a thickened mineral oil as a vehicle, which would tend to collect foreign material. A better choice would be Molykote M-88, or Spray-kote. Both are commercially available Dow Corning products.

7. Inspection. Following the above cleaning and lubrication the entire breaker should be operationally checked and inspected for broken parts, loose bolts or excessive wear.

This Date Letter and the above information supersedes Technical Bulletin NSD-TB-74-1, which is hereby cancelled.

W. H. Furfari
Electric Technology
TECHNICAL OPERATIONS

APPROVED: Syndey G. Caslake, Manager
Electric Technology
TECHNICAL OPERATIONS

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Attachment

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APPENDIX B

Documentation of Bulletin Closeout

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TABLE B.1 BULLETIN CLOSEOUT STATUS

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Arkansas 1	AP&L	50-313	OL	IV	B&W	03-21-83	83-06(04-13-83) 83-09(05-16-83) 85-01(02-25-85)	Closed 3
Arkansas 2	AP&L	50-368	OL	IV	C-E	03-21-83	83-06(04-13-83) 83-09(05-16-83) 85-01(02-25-85)	Closed 3
Beaver Valley 1	DLC	50-334	OL	I	W		83-08(05-17-83)	Closed 2
Calvert Cliffs 1	BG&E	50-317	OL	I	C-E	03-21-83 03-30-83	85-09(06-12-85)	Closed 3
Calvert Cliffs 2	BG&E	50-318	OL	I	C-E	03-21-83 03-30-83	85-09(06-12-85)	Closed 3
Cook 1	IMECO	50-315	OL	III	W		84-02(04-03-84)	Closed 2
Cook 2	IMECO	50-316	OL	III	W		84-02(04-03-84)	Closed 2
Crystal River 3	FPC	50-302	OL	II	B&W	03-21-83 11-25-83	83-26(11-01-83)	Closed 3
Davis-Besse 1	TECO	50-346	OL	III	B&W	03-24-83	84-06(06-29-84)	Closed 3
Farley 1	APCO	50-348	OL	II	W	03-25-83 05-10-83	83-09(05-06-83)	Closed 3
Farley 2	APCO	50-364	OL	II	W	03-25-83 05-10-83	83-07(05-06-83)	Closed 3
Fort Calhoun 1	OPPD	50-285	OL	IV	C-E	03-28-83	83-11(05-16-83)	Closed 3
Ginna	RG&E	50-244	OL	I	W			Closed 2
Haddam Neck	CYAPCO	50-213	OL	I	W			Closed 2
Indian Point 2	ConEd	50-247	OL	I	W			Closed 2
Indian Point 3	NYPA	50-286	OL	I	W			Closed 2
Kewaunee	WPS	50-305	OL	III	W		83-15(12-28-83)	Closed 2
Maine Yankee	MYAPCO	50-309	OL	I	C-E	(Note 5)	83-06(07-25-83)	Closed 3 (Note 6)
McGuire 1	DUPCO	50-369	OL	II	W	03-22-83	83-21(06-22-83)	Closed 3 (Note 6)
Millstone 2	NNECO	50-336	OL	I	C-E	03-21-83	84-07(04-18-84)	Closed 3

See notes at end of table.

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TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
North Anna 1	VEPCO	50-338	OL	II	W		84-06(02-01-85)	Closed 2
North Anna 2	VEPCO	50-339	OL	II	W		84-06(02-01-85)	Closed 2
Oconee 1	DUPCO	50-269	OL	II	B&W	03-21-83	84-10(06-13-84)	Closed 3
Oconee 2	DUPCO	50-270	OL	II	B&W	03-21-83	84-10(06-13-84)	Closed 3
Oconee 3	DUPCO	50-287	OL	II	B&W	03-21-83	84-11(06-13-84)	Closed 3
Palisades	CPC	50-255	OL	III	C-E	03-21-83	83-10(05-13-83)	Closed 3
Point Beach 1	WEPCO	50-266	OL	III	W		83-04(04-22-83)	Closed 2
Point Beach 2	WEPCO	50-301	OL	III	W		83-04(04-22-83)	Closed 2
Prairie Island 1	NSP	50-282	OL	III	W		83-06(05-05-83)	Closed 2
Prairie Island 2	NSP	50-306	OL	III	W		83-05(05-05-83)	Closed 2
Rancho Seco 1	SMUD	50-312	OL	V	B&W	03-24-83 05-09-83	84-07(06-04-84)	Closed 3
Robinson 2	CP&L	50-261	OL	II	W		84-16(05-29-84)	Closed 2
Salem 1	PSE&G	50-272	OL	I	W			Closed 2
Salem 2	PSE&G	50-311	OL	I	W			Closed 2
San Onofre 1	SCE	50-206	OL	V	W		84-13(08-21-84)	Closed 2
San Onofre 2	SCE	50-361	OL	V	C-E	03-22-83	83-13(04-13-83) 84-16(08-21-84)	Closed 3
San Onofre 3	SCE	50-362	OL	V	C-E	03-22-83	83-12(04-13-83) 84-17(08-21-84)	Closed 3
Sequoyah 1	TVA	50-327	OL	II	W			Closed 2
Sequoyah 2	TVA	50-328	OL	II	W			Closed 2
St. Lucie 1	FPL	50-335	OL	II	C-E	03-24-83	84-08(04-06-84)	Closed 3
Summer 1	SCE&G	50-395	OL	II	W	03-23-83	84-11(05-18-84)	Closed 3
Surry 1	VEPCO	50-280	OL	II	W			Closed 2
Surry 2	VEPCO	50-281	OL	II	W			Closed 2
TMI 1	GPUN	50-289	OL	I	B&W	03-22-83	84-21(08-17-84)	Closed 3
TMI 2	GPUN	50-320	SDI	I	B&W	03-24-83		Closed 1
Trojan	PGE	50-344	OL	V	W			Closed 2

See notes at end of table.

TABLE B.1 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date	Closeout Status and Criterion
Turkey Point 3	FPL	50-250	OL	II	W			Closed 2
Turkey Point 4	FPL	50-251	OL	II	W			Closed 2
Yankee-Rowe 1	YAECO	50-029	OL	I	W	05-24-83	83-06(09-07-83)	Closed 3
Zion 1	CECO	50-295	OL	III	W		84-03(05-21-84)	Closed 2
Zion 2	CECO	50-304	OL	III	W		84-03(05-21-84)	Closed 2

Notes for Table B.1:

1. Facility status is current, and is based on references 1, 2 and 3, Page B-7.

2. The following abbreviations apply to facility status:
   OL, Operating Licensee; SDI, Shut Down Indefinitely.

3. Refer to Page 3 for closeout criteria.

4. This table includes all PWRs which had operating licenses as of March 1983 when the bulletin was issued, and one which has been shut down indefinitely.

5. Response dates for Maine Yankee: 03-24-83, 05-04-83, 05-18-83, 07-20-83, 12-05-83.

6. Bulletin closeout is confirmed by NRC/IE letter, Reference 5, Page B-7.

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TABLE B.2 LIST OF FACILITIES ISSUED IEB 83-04 FOR INFORMATION

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date
Beaver Valley 2	DLC	50-412	CP	I	W	06-26-83	86-03(03-21-86)
Bellefonte 1	TVA	50-438	CP	II	B&W		
Bellefonte 2	TVA	50-439	CP	II	B&W		
Big Rock Point 1	CPC	50-155	OL	III	GE		
Braidwood 1	CECO	50-456	CP	III	W		86-05(02-18-86)
Braidwood 2	CECO	50-457	CP	III	W		86-04(02-18-86)
Browns Ferry 1	TVA	50-259	OL	II	GE		
Browns Ferry 2	TVA	50-260	OL	II	GE		
Browns Ferry 3	TVA	50-296	OL	II	GE		
Brunswick 1	CP&L	50-325	OL	II	GE		
Brunswick 2	CP&L	50-324	OL	II	GE		
Byron 1	CECO	50-454	OL	III	W	04-26-84	84-19(05-10-84)
Byron 2	CECO	50-455	CP	III	W	04-26-84	84-14(05-10-84)
Callaway 1	UE	50-483	OL	III	W		83-15(09-23-83)
Catawba 1	DUPCO	50-413	OL	II	W		84-33(05-10-84)
Catawba 2	DUPCO	50-414	LPTL	II	W		84-19(05-10-84)
Clinton 1	IP	50-461	CP	III	GE		84-04(04-24-84)
Comanche Peak 1	TUGCO	50-445	CP	IV	W		84-22(10-02-84)
Comanche Peak 2	TUGCO	50-446	CP	IV	W		84-07(10-02-84)
Cooper Station	NPPD	50-298	OL	IV	GE		83-06(05-26-83)
Diablo Canyon 1	PG&E	50-275	OL	V	W		84-24(10-10-84)
Diablo Canyon 2	PG&E	50-323	OL	V	W		84-14(10-10-84)
Dresden 1	CECO	50-010	SDI	III	GE		84-02(04-10-84)
Dresden 2	CECO	50-237	OL	III	GE		84-03(04-10-84)
Dresden 3	CECO	50-249	OL	III	GE		84-02(04-10-84)
Duane Arnold	IELPCO	50-331	OL	III	GE		83-07(07-15-83)
Fermi 2	DECO	50-341	OL	III	GE		83-29(12-19-83)
FitzPatrick	NYPA	50-333	OL	I	GE		

See notes at end of table.

TABLE B.2 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date
Fort St. Vrain	PSCC	50-267	OL	IV	GA		83-22(08-18-83)
Grand Gulf 1	MP&L	50-416	OL	II	GE		
Harris 1	CP&L	50-400	CP	II	W		
Hatch 1	GPC	50-321	OL	II	GE		
Hatch 2	GPC	50-366	OL	II	GE		
Hope Creek 1	PSE&G	50-354	LPTL	I	GE		
Humboldt Bay 3	PG&E	50-133	SDI	V	GE		
Indian Point 1	ConEd	50-003	SDI	I	B&W		
La Crosse	DPC	50-409	OL	III	Allis		84-02(03-28-84)
LaSalle 1	CECO	50-373	OL	III	GE		83-12(06-08-83)
LaSalle 2	CECO	50-374	OL	III	GE		83-10(06-08-83)
Limerick 1	PECO	50-352	OL	I	GE		
Limerick 2	PECO	50-353	CP	I	GE		
McGuire 2	DUPCO	50-370	OL	II	W	03-22-83	83-29(06-22-83)
Millstone 1	NNECO	50-245	OL	I	GE		
Millstone 3	NNECO	50-423	OL	I	W		85-35(08-29-85)
Monticello	NSP	50-263	OL	III	GE		84-03(04-03-84)
Nine Mile Point 1	NMP	50-220	OL	I	GE		
Nine Mile Point 2	NMP	50-410	CP	I	GE		86-28(07-10-86)
Oyster Creek 1	GPUN	50-219	OL	I	GE		86-04(04-04-86)
Palo Verde 1	APSCO	50-528	OL	V	C-E		84-51(01-28-85)
Palo Verde 2	APSCO	50-529	LPTL	V	C-E		84-35(01-28-85)
Palo Verde 3	APSCO	50-530	CP	V	C-E		84-13(07-06-84)
Peach Bottom 2	PECO	50-277	OL	I	GE		84-26(09-21-84)
Peach Bottom 3	PECO	50-278	OL	I	GE		84-22(09-21-84)
Perry 1	CEI	50-440	LPTL	III	GE		83-16(06-15-83)
Perry 2	CEI	50-441	CP	III	GE		83-15(06-15-83)
Pilgrim 1	BECO	50-293	OL	I	GE		

See notes at end of table.

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TABLE B.2 (contd)

Facility	Utility	Docket	Facility Status	NRC Region	NSSS	Utility Response Date	Inspection Report and Date
Quad Cities 1	CECO	50-254	OL	III	GE		
Quad Cities 2	CECO	50-265	OL	III	GE		
River Bend 1	GSU	50-458	OL	IV	GE		85-52(08-23-85)
Seabrook 1	PSNH	50-443	CP	I	W		85-20(09-12-85)
Seabrook 2	PSNH	50-444	CP	I	W		
Shoreham	LILCO	50-322	LPTL	I	GE		83-21(08-12-83)
South Texas 1	HL&P	50-498	CP	IV	W		
South Texas 2	HL&P	50-499	CP	IV	W		
St. Lucie 2	FPL	50-389	OL	II	C-E	03-31-83	83-30(04-15-83)
Susquehanna 1	PP&L	50-387	OL	I	GE		83-23(11-18-83)
Susquehanna 2	PP&L	50-388	OL	I	GE		83-21(11-18-83)
Vermont Yankee 1	VYNP	50-271	OL	I	GE		
Vogtle 1	GPC	50-424	CP	II	W		
Vogtle 2	GPC	50-425	CP	II	W		
WNP 1	WPPSS	50-460	CP	V	B&W		
WNP 2	WPPSS	50-397	OL	V	GE		83-59(12-16-83)
WNP 3	WPPSS	50-508	CP	V	C-E		
Waterford 3	LP&L	50-382	OL	IV	C-E		
Watts Bar 1	TVA	50-390	CP	II	W		85-08(03-28-85)
Watts Bar 2	TVA	50-391	CP	II	W		85-08(03-28-85)
Wolf Creek 1	KG&E	50-482	OL	IV	W		84-44(01-11-85)

Notes for Table B.2:

1. Facility status is current, and is based on references 1, 2 and 3, Page B-7.

2. The following abbreviations apply to facility status: CP, Construction Permit; LPTL, Low Power Testing License; OL, Operating License; SDI, Shut Down Indefinitely.

3. Table B.2 includes all nuclear power facilities not listed in Table B.1.

REFERENCES

1. United States Nuclear Regulatory Commission, Licensed Operating Reactors, Status Summary Report, Data as of 05-31-86, NUREG-0020, Volume 10, Number 6, June 1986.

2. United States Nuclear Regulatory Commission, Nuclear Power Plants, Construction Status Report, Data as of 06-30-82, NUREG-0030, Volume 6, Number 2, October 1982.

3. United States Nuclear Regulatory Commission, Listing of Inactive Current Holders of Construction Permits, Letter dated May 29, 1985, to Richard A. Lofy (Parameter, Inc.) from Robert L. Baer (NRC/IE HQ).

4. United States Nuclear Regulatory Commission, Code of Federal Regulation, Energy, Title 10, Chapter 1, January 1, 1986, cited as 10CFR 0.735-1.

5. United States Nuclear Regulatory Commission, Closeout of IE Bulletins 83-01, 83-04, Letter Dated February 17, 1987, to Robert S. Dean (Parameter, Inc.) from Robert L. Baer (NRC/IE HQ).

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APPENDIX C

Abbreviations

Allis	Allis-Chalmers Company
APCO	Alabama Power Company
AP&L	Arkansas Power and Light Company
APSCO	Arizona Public Service Company
BECO	Boston Edison Company
BG&E	Baltimore Gas and Electric Company
CECO	Commonwealth Edison Company
CEI	Cleveland Electric Illuminating Company
CFR	Code of Federal Regulations
ConEd	Consolidated Edison Company of New York, Inc.
CP	Construction Permit
CPC	Consumers Power Company
CP&L	Carolina Power and Light Company
CR	Contractor Report
CYAPCO	Connecticut Yankee Atomic Power Company
DECO	Detroit Edison Company
DLC	Duquesne Light Company
DPC	Dairyland Power Cooperative
DUPCO	Duke Power Company
FPC	Florida Power Corporation
FPL	Florida Power & Light Company
GA	Gulf Atomic
GAO	Government Accounting Office
GPC	Georgia Power Company
GPUN	GPU Nuclear Corporation
GSU	Gulf States Utilities Company
HL&P	Houston Lighting and Power Company
IE	(See NRC/IE)
IEB	Inspection and Enforcement Bulletin (NRC)
IEIN	IE Information Notice (NRC)
IELPCO	Iowa Electric Light and Power Company
IMECO	Indiana and Michigan Electric Company
IP	Illinois Power Company
IR	Inspection Report (NRC/IE)
KG&E	Kansas Gas and Electric Company
LER	Licensee Event Report
LILCO	Long Island Lighting Company
LOCA	Loss of Cooling Accident

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LP&L	Louisiana Power and Light Company
LPTL	Low Power Testing License
MP&L	Mississippi Power and Light Company
MYAPCO	Maine Yankee Atomic Power Company
NMP	Niagara Mohawk Power Company
NNECO	Northeast Nuclear Energy Company
NPPD	Nebraska Public Power District
NRC/IE	Nuclear Regulatory Commission/ Office of Inspection & Enforcement
NRR	Office of Nuclear Reactor Regulation, (NRC)
NSP	Northern States Power Company
NYPA	New York Power Authority
OL	Operating License
OPPD	Omaha Public Power District
PECO	Philadelphia Electric Company
PGE	Portland General Electric Company
PG&E	Pacific Gas and Electric Company
PP&L	Pennsylvania Power and Light Company
PSCC	Public Service Company of Colorado
PSE&G	Public Service Electric and Gas Company
PSNH	Public Service Company of New Hampshire
R	Region (NRC)
RG&E	Rochester Gas and Electric Corporation
RPV	Reactor Pressure Vessel
RPS	Reactor Protection System
RTB	Reactor Trip Breaker
SCE	Southern California Edison Company
SCE&G	South Carolina Electric and Gas Company
SDI	Shut Down Indefinitely
SER	Safety Evaluation Report
SMUD	Sacramento Municipal Utility District
SNUPPS	Standardized Nuclear Unit Power Plant Systems
TECO	Toledo Edison Company
TI	Temporary Instruction (NRC)
TMI	Three Mile Island
TUGCO	Texas Utilities Generating Company
TVA	Tennessee Valley Authority
UE	Union Electric Company
UV	Undervoltage
UVTA	Undervoltage Trip Attachment
VEPCO	Virginia Electric and Power Company
VYNP	Vermont Yankee Nuclear Power Corporation
W	Westinghouse Electric Corporation
WEPCO	Wisconsin Electric Power Company
WNP	Washington Nuclear Project
WPPSS	Washington Public Power Supply System
WPS	Wisconsin Public Service Corporation
YAECO	Yankee Atomic Electric Company

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13. ABSTRACT (200 words or less)

During shutdown of San Onofre units 2 and 3 on March 3 and 8, 1983, four General Electric (GE) Type AK-2 circuit breakers in the reactor protection systems (RPSs) failed to open on activation of the undervoltage trip coil during testing. Since issuance of IE Bulletin 79-09 April 17, 1979 on failures of GE Type AK-2 breakers, additional failures had been reported before the tests at San Onofre. Because of concern about continued failures of the subject breakers in RPSs, the NRC/IE issued IE Bulletin 83-04 on March 11, 1983. All licensees of operating pressurized water power reactors, except those with Westinghouse Type DB breakers, were required to take five specific actions. The bulletin was issued for information to all other nuclear power facilities. Evaluation of utility responses and NRC/IE inspection reports indicates that the bulletin can be closed out for all of the 50 facilities to which it was issued for action. Six plants had breakers which failed to operate satisfactorily during tests for bulletin requirements. There are no remaining areas of concern for this bulletin.

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